SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

22 February – 20 March 2020

TOPICAL REPORT

CITIES

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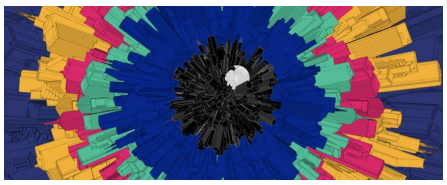
SMART CITIES



How to design a smart city that's built on empowerment—not corporate surveillance

"It starts with people and their ability to participate and mobilize—not new technologies offering dubious benefits and incremental convenience, simply handed down to residents. Empowerment-based approaches have helped marginalized individuals—ranging from slum dwellers to low-income workers—build social capital, receive more responsible public services, and improve their health."
Source: Fast Company

The Role Of End Users In Smart City Innovation

"Most smart city workshops led by big consultancies move right into discussions about electric and autonomous vehicles, mass transit mobility, IoT, 5G, data, renewable energy and distributed grid, urban farming, smart buildings, innovation, and knowledge economy. But what's often missing in these projects is the direct involvement of citizens, the end users of smart city solutions."
Source: Forbes

The world's best smart cities don't just adopt new technology: they make it work for people

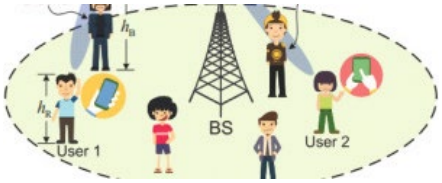
"That's why a team of researchers from IMD in Switzerland and SUTD in

SUSTAINABLE CITIES

Green space ideas and practices in European cities

"Activities in cities are important drivers of global carbon fluxes. Here the authors trace the carbon metabolism in 16 global cities in terms of both physical and virtual carbon inflows, stock changes and outflows in relation to the supply chains of urban production and consumption and show that the total carbon impacts of global cities are found to be highly varied in either per capita, intensity or density measures."
Source: Journal of Environmental Planning and Management

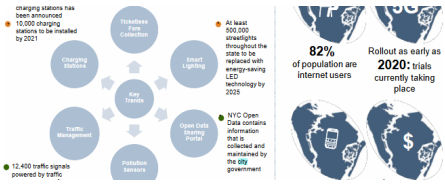
SMART CITIES



Applications of Artificial Intelligence and Machine learning in smart cities

"In this survey, we present in-depth details of the applications of the prior techniques in intelligent transportation systems (ITSs), cyber-security, energy-efficient utilization of smart grids (SGs), effective use of unmanned aerial vehicles (UAVs) to assure the best services of 5G and beyond 5G (B5G) communications,

SMART CITIES



Future of Smart Cities—Key City Profiles

"Increased urban penetration coupled with the rapid expansion of cities have resulted in a lot more dependence on resources such as water, energy, environment, infrastructure, and other basic utilities. This has also resulted in spikes in congestion and pollution. Such stress on city resources has forced government institutions and municipalities to look at alternative means of managing cities. This has brought about a move toward smart solutions that are more sustainable, green, and resourceful. Smart cities are cities built on smart solutions and technology that will lead to the adoption of intelligent and seamless transportation and other sustainable plans."
Source: Frost & Sullivan

SUSTAINABLE CITIES

Micromobility: Moving cities into a sustainable future

"With Voi data in hand, we took our analysis one step further and interviewed city officials in major cities

Singapore – including myself – put together the Smart City Index. For the first time, we attempted to assess people's perceptions of technology – as opposed to the quality of the technology itself – as a way to characterise the "smartness" of a city. We did this by conducting a massive survey among citizens of 102 cities, to assess how favourably they viewed the technology made available to them."
Source: City Metric

Designing Smart Cities: A Human-Centered Approach

"By 2025, Frost and Sullivan, a market research company, has predicted that there will be at least 26 fully-fledged major smart cities around the world. While some still think that as our cities get more intelligent, they will resemble sci-fi futuristic movies, the reality is that the quality of life in these cities will drastically improve. Cities are set to become more efficient with better services. Nevertheless, before reaching these ideals, let us go back on the process itself, and evaluate the challenges that we might face."
Source: ArchDaily

3 reasons why Singapore is the smartest city in the world

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Source: ArchDaily

SUSTAINABLE CITIES

Sustainable Cities Will Likely Be The Winners In The Future

"In this day and age of increasing social isolation, there is a noticeable trend of people relocating to cities and towns that offer a higher quality of life. Certainly, drivers such as a lower cost of living, vast open space, and a top-notch school system come to mind right away. What is perhaps less obvious is a deep desire to reside in communities governed by formal sustainability plans that not only encourage but function as a result of layperson involvement. The city of Temecula, CA (population 115,000) is and smart health care system in a smart city."
Source: Computer Communications

Smart, Smarter, and Smartest City: The Method to Comparison of Cities

"The paper describes the use of DEA method for comparing cities with each other. The DEA description includes an illustrative example showing the differences between VRS, CRS, and FDH models. The paper also describes the software application that is developed for the purpose to compare the efficiency of municipalities."
Source: 4th EAI International Conference on Management of Manufacturing Systems

IoT: The Interconnection of Smart Cities

"A city of the future is an ever-connected, information driven place where every object can have an internet presence. The Internet of Things (IoT) is paving the way for interconnected sensors to be a part of every major device and building we visit. Barriers to growth in these cities stem from slow connectivity, congested signals and a Cloud that needs to keep pace. IoT is the platform for a scalable, unified cloud system that anyone can use to interact with technology all over from the comfort of their home or office. In this short paper, we explore upcoming technologies like 5G and Cloud/Fog Computing to see how a city can benefit from the improved communication ability granted by these systems."
Source: 2019 SoutheastCon

Social Media as a People Sensing for the City Government in Smart Cities Context

"Social media have a huge impact on different areas of modern life. In smart city context, they can be used as a tool for enhancing dialogue between citizens and municipalities. Based on present research, empirical evidence is provided on insufficient use of social media capabilities. Relationship between smart cities and social media power is examined through study on the example of Varna municipality. An analysis of city government presence in social media was conducted. Through online questionnaire the citizens' attitude towards smart city concept was studied. Suggestions for improving the communication between citizens and municipal administration of Varna are given."
Source: TEM Journal

across six European countries to understand their view of the role of e-scooters for urban development. Finally, to interpret the findings and derive recommendations for how cities can unlock the benefits of micromobility to create more sustainable and accessible cities, we enlisted the help of EY subject matter professionals across several practice areas, including Climate Change and Sustainability, Future of Mobility and Strategy."
Source: EY

Future of Infrastructure

"76 per cent of adults worldwide believe investing in infrastructure is vital to their country's future economic growth, but are countries listening? Our Future of Infrastructure special report, published in The Times, explores how infrastructure is changing to adapt in various countries and cities. It examines Japan's plans for Society 5.0 by balancing digital and physical worlds to benefit the people and Toronto's techlash over new smart development. It also looks at vehicle-to-grid systems to bring cleaner air to schoolchildren and the top five examples of overcoming obsolescence. The featured infographic shows how satisfied the public is with their country's infrastructure and how they think it needs to change in the future."
Source: Raconteur

a shining star in this regard and people are noticing."
Source: Forbes

URBAN TRANSPORT

MVRDV and Airbus Integrate Air Mobility into Urban Environments

"MVRDV in collaboration with Airbus, Bauhaus Luftfahrt, ETH Zurich, and Systra, is developing a plan for the future of Urban Air Mobility (UAM). The investigation tackles the integration of "flying vehicles" into our urban environments and envisions a comprehensive mobility concept."
Source: Archdaily

URBAN PLANNING

Pandemics Are Also an Urban Planning Problem

"Part of this means thinking about decentralization of essential services. Singapore had to shut down its main hospitals during SARS. Many countries such as Italy are considering door-to-door testing. But we need to also rethink the ways, perhaps digital ones, we test and contain. How would we manage to do door-to-door testing even just in Melbourne alone, with 5 million residents, and in giants like Shanghai and London with upwards of 10 million dwellers? Bubbling up are some core questions about what we've been told is desirable urbanization versus what makes sense from an infectious disease perspective."
Source: CityLab

Is 3-D Visualization Software the Future of Urban Planning?

"Research from Carnegie Mellon University, together with the Pittsburgh Department of City Planning, uses virtual reality and 3-D technology to help urban designers and other stakeholders better plan cities."
Source: Govtech

Tokyo's incredible path to redevelopment

"As extensive preparations for the Tokyo 2020 Olympic and Paralympic Games steam ahead, we look at the city's history of urban redesign and rapid development."
Source: BBC

Security, Privacy, and Efficiency of Sustainable Computing for Future Smart Cities

"Sustainable computing is a rapidly expanding field of research covering the fields of multidisciplinary engineering. With the rapid adoption of Internet of Things (IoT) devices, issues such as security, privacy, efficiency, and green computing infrastructure are increasing day by day. To achieve a sustainable computing ecosystem for future smart cities, it is important to take into account their entire life cycle from design and manufacturing to recycling and disposal as well as their wider impact on humans and the places around them. The energy efficiency aspects of the computing system range from electronic circuits to applications for systems covering small IoT devices up to large data centers. This editorial focuses on the security, privacy, and efficiency of sustainable computing for future smart cities."
Source: Journal of Information Processing Systems

The Smart Cities MethodoLogy based on public value: The first evaluation cycle

"This paper analyzes the results obtained from a first evaluation cycle of the Smart Cities MethodoLogy and its components (a reference model and an assessment method), developed based on a Public Value perspective, in a study conducted within the Design Science epistemological paradigm and Design Science Research method."
Source: Brazilian Administration Review

Necessity of the Needs Map in the Service Design for Smart Cities

"in this study, we propose the needs map which can be applied to various stages of service development and help service designers to make efficient and reasonable decisions without being too time-consuming. The proposed needs map is a schematization of theoretical concepts for Smart city planning in accordance with the framework of service-technology-infrastructure-management (STIM). Through the needs map, various urban problems, statistical data, and users' needs in a smart city are classified and analyzed concept by concept, and these focused analysis results suggest a proper direction to researchers in the service development plan."
Source: Frontiers in Psychology

Edge-to-Edge Cooperative Artificial Intelligence in Smart

INTEGRATED CITIES

Society 5.0: Japan's lofty plans face hurdles

"In Society 5.0, social problems are solved by into the physical world. Carbon emissions are cut by driverless vehicles choosing the shortest route home. Robots take care of the elderly, using body sensors to flag up if additional human help is needed. Artificial intelligence (AI) will sift your online history and health records to build you the perfect itinerary for a city break, for example, tailored just so to your tastes and abilities, and the weather forecast."
Source: Raconteur

Cities with On-Demand Learning Offloading

"this paper proposes an on-demand learning offloading mechanism for edge-to-edge cooperative AI. Firstly, the principle of the learning capability and its offloading are proposed for the formal description of the learning resources migration. Secondly, the proposed mechanism realizes the bilateral learning offloading utilizing edge-to-edge and cloud-edge collaborations to handle AI-based tasks with high learning efficiency and resource utilization rate."
Source: 2019 IEEE Global Communications Conference (GLOBECOM)

URBAN TRANSPORT

An energy-aware algorithm for electric vehicle infrastructures in smart cities

"In this work, we tackle the problem of locating a set of charging stations in a smart city considering heterogeneous data sources such as open data city portals, geo-located social network data, and energy transformer substations. We use a multi-objective genetic algorithm to optimize the charging station locations by maximizing the utility and minimizing the cost. Our proposal is validated through a case study and several experimental results."
Source: Future Generation Computer Systems

Traffic signal control for smart cities using reinforcement learning

"this study proposes a TSC system to maximize the number of vehicles crossing an intersection and balances the signals between roads by using Q-learning (QL). The proposed system has a flexible structure that can be modified to suit the changes in the original structure of the intersection."
Source: Computer Communications

URBAN DESIGN

Designing Playful Cities: Audio-Visual Metaphors for New Urban Environment Experience

"This paper discusses two playful outdoor artworks featuring audio-

visual metaphors capable of involving the audience in playful and social experience in an urban space. We used sensor technologies and visually enhanced public spaces, together with sonic interaction design approach, to enrich aesthetic and fictional dimensions of the urban environments. Our design issues were to create playful and responsive public space which will immerse the audience in interactive audio-visual experience. The artworks "Vrroom" and "The Light and Shade of Realm" focus in on smart city concept viewpoint related to social rather than efficiency dimensions to consider in future living environments development. "

Source: Mobile Networks and Applications

Features and Causes of Segregation of Large Cities

"The research is devoted to the phenomenon of city segregation which is promoted the steady trend of an urbanization supported by the government and public organizations, increase in number of immigrants, increase of differentiation of income of citizens. Subject to segregation of the city with a population of over 250 thousand people, they are of interest in the current work. Resettlement of people in city space and, therefore, formation of its borders and architectural appearance we occur for the reasons of mainly economic or national character. At the same time the national aspect is often connected with economic features. City a segregation also differs on formation time for steady and temporary, the architectural and spatial structure of those directly depends on a view of the settlement. "

Source: IOP Conference Series: Materials Science and Engineering

INCLUSIVE CITIES

Towards Affective Walkability for Healthy Ageing in the Future of the Cities

"in order to assess innovative approaches towards an af-fective walkability, and open novel investigation fields involving affectivecomputing, pedestrian dynamics and artificial intelligence. The main aimof the paper is to illustrate some preliminary studies conducted withinan experimental activity to test the validity of the approach."